Remarks/Arguments

A.   Claims in the Case

Claims 1- 33 have been rejected. Claims 1, 2, and 18 have been amended. Claims 4 and 20 have been cancelled. Claims 55 – 57 have been added. Claims 1- 3, 5 – 19, 21-33, and 55 – 57 are pending. Applicant submits that neither amendment of claims nor the addition of claims 55 – 57 incorporate new matter.

B.   The Claims Are Definite Pursuant to 35 U.S.C. § 112 Second Paragraph

The Examiner has rejected claims 1 – 33 pursuant to 35 U.S.C. § 112, Second Paragraph as allegedly being indefinite for failing to point out and distinctly claim the subject matter Applicant regards as his invention.

The Examiner asserts that, since the disclosure fails to describe the shear rate employed to measure the viscosity of the inventive layered silicate, and that the claims describe the inventive layered silicate to have a viscosity of > 200,000 centipoise, one of ordinary skill in the art cannot determine the scope of the subject matter sought to be patented. Applicant respectfully traverses.

Applicant submits that the viscosity of a non-Newtonian fluid depends on the applied shear rate. Viscosity measurements of the synthetic layered silicates of Examples 1 – 5 were determined empirically using a rotational viscometer. Page 18, lines 6 – 9 of Applicant's specification recites:

> The effect of an electrolyte on the dispersion of the synthetic layered silicate may be related to the viscosity measurements. The viscosity measurements were conducted using a Brookfield DVII viscometer. The electrolyte tolerance of Examples 1-5 were determined using sodium sulfate as the electrolyte.

A rotational viscometer, such as the Brookfield DVII, directly measures a fluid's shear stress by sensing the torque required to rotate a spindle that is immersed in the sample fluid rotating at constant speed. The torque is proportional to the viscous drag on the immersed spindle, and thus to the viscosity of the fluid.

By measuring the shear stress exerted on a fluid at varying rotational speeds, a flow curve depicting shear stress as a function of shear rate (i.e., rotational speed) can be generated. The viscosity of a non-Newtonian test fluid is then calculated by determining the slope of the linear portion of the flow curve. Applicant's instant specification teaches the use of such a flow curve in the determination of a non-Newtonian fluid's Bingham Yield Value. Page 2, line 23 – page 3, line 8 of Applicant's instant specification recites:

> While synthetically produced layered silicates may have a crystal structure similar to natural hectorite, they may not have good rheological properties. Measuring the Bingham Yield Value of an aqueous dispersion of a substance may provide a standard comparator of the rheological properties between substances. The term Bingham Yield Value, also known as Bingham Yield Stress, is referred to in standard works on rheology. References to Bingham Yield Value may be found in "Rheology Theory and Applications", F. R. Eirich, Acad. Press, Volume 1, 1956, page 658; "Colloidal Dispersions", L. K. Fischer, N. Y. Bureau of Standards, 2nd Edition, 1953, pages 150-170 and "The Chemistry and Physics of Clays and other Ceramic Materials", 3rd Edition, page 463, A. B. Searle and R. W. Grimshaw, all of which are incorporated herein by reference.

> The Bingham Yield Value may be determined by first obtaining a flow curve relating the shear stress to the rate of shear. The straight-line section of the curve is extrapolated to the shear stress axis. The intercept at the shear stress axis is the Bingham Yield Value. The Bingham Yield Value may conveniently be determined on any viscometer capable of measuring a range of shear rates and shear stresses.

Applicant contends that the technique of rotational viscometry is well known in the rheological arts. Applicant further contends that a practitioner of ordinary skill in the art, while understanding that the shear stress and viscosity of a fluid depends on the shear rate applied, does not require a recitation of the rotational speeds (i.e., shear rates) used to determine the viscosities of the Synthetic Layered Silicates of the present invention.

Applicant is of the belief that an explicit recitation of shear rate values used in determining the rheological properties of presently claimed Synthetic Layered Silicates is not required for an ordinary practitioner of the art to determine that the instant specification is commensurate in scope with the claimed subject matter. A withdrawal of the 35 U.S.C. § 112, Second Paragraph rejection against claims 1 – 33 is therefore respectfully requested.

C.   The Claims Are Not Anticipated by Bauer Under 35 U.S.C. § 102(e)

The Examiner has rejected claims 1 – 33 pursuant to 35 U.S.C. §102 (e) as allegedly being anticipated by U.S. Patent No. 6,274,111 granted to Bauer et al. (hereinafter referred to as Bauer).

The standard for "anticipation" is one of strict identity. A claim can only be anticipated if each and every element set forth in the claims is found to be either expressly or inherently described in the cited art. *Verdegaal Bros. V. Union Oil Co. of California*, 814 F.2d 728, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987), MPEP § 2131.

Amended claim 1 states:

1. A synthetic layered silicate comprising the formula:

$$[Si_8(Mg_aLi_b)O_{20}(OH)_{4-y}F_y]^{z-} \ zM^+$$
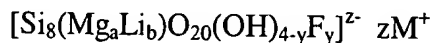
wherein $a = 4.75$ to 5.45; $b = 0.25$ to 1.25; $y = 0$ to < 4; $z = 12-2a-b$; and M is Na^+ or Li^+; and

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wherein the SiO_2/MgO is 2.20 to 2.40 and the lithium content is 0.40% to 0.80%

The Examiner asserts that, in light of the latitude in interpreting the word "about", the lithium content and SiO_2/MgO ratio of the Synthetic Layered Silicate of instant claim 1 is anticipated by Examples 3 and 5 of Bauer. Applicant respectfully traverses.

Applicant's composition is directed to a synthetic layered silicate that includes, but is not limited to, the feature of, a SiO_2/MgO ratio of 2.20 to 2.40. Applicant submits that Bauer does not appear to teach or suggest at least this ratio.

The Examiner states that:

> Moreover, Example 3 of Bauer et al. has a lithium content of 0.48 wt%
> and a SiO_2/MgO weight ratio of 2.15, and Example 5 has a lithium content
> of 0.54 wt% and a SiO_2/MgO weight ratio of 2.16.

Applicant submits that synthetic layered silicates that have a ratio of either 2.15 or 2.16 do not anticipate Applicant's claimed silicate. Applicant synthesized 5 examples of layered silicates, the preparation of these compounds and the ratio of the various components are listed in tables 1 and 2, respectively of Applicant's specification (see page 19). Example 1 was prepared as a comparative example according to a prior art procedure. (See for example, Applicant's specification, page 20 which states: "Example 1 was prepared following the procedure of U.S. Patent No. 4,049,780, Example 2, which is incorporated herein by reference."). Example 1 has a SiO_2/MgO ration of 2.14. Examples 2,3,4, and 5 all have SiO_2/MgO ratios that are between 2.20 and 2.40. WIth respect to the electrolyte tolerance of these examples, Applicant's specification states:

> Referring to Figure 1 and corresponding Table 5, Examples 3, 4, and 5
> have a much greater tolerance to the presence of an electrolyte when
> compared to Example 1. Example 2 has improved tolerance to the

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presence of electrolyte, but this product has other disadvantages to Examples 3, 4, and 5.
(Specification, page 22, lines 6-9)

As such, Applicant submits that Bauer does not appear to teach or suggest all of the features of applicant's claim 1.

Amended claim 2 states:

2.   A method of making a synthetic layered silicate comprising:

mixing a magnesium metal compound with a lithium compound solution, to form a magnesium/lithium mixture;

adding to the magnesium/lithium mixture a carbonate compound to form a magnesium/lithium/carbonate mixture; and

adding to the magnesium/lithium/carbonate mixture a silicate compound.

Support for the amendments to claim 2 can be found, for example, in Applicant's specification, page 5, which states:

In an embodiment, a lithium compound may be added to water followed by addition of a water-soluble magnesium compound. The aqueous mixture may be heated to above ambient temperature and gently stirred. A soluble carbonate solution may be added to the lithium and magnesium mixture with stirring. Magnesium carbonate may begin to precipitate. Subsequently, a soluble silicate solution may be added to the mixture. The resulting solution and precipitate may be stirred and hydrothermally treated for a selected time period to produce suitable crystal growth. Hydrothermal treatment may be defined as heating the solution to at least the boiling point of the solution, capturing the vapor, condensing the vapor and returning the condensate to the solution. An autoclave may be used in hydrothermal treatment. The resulting precipitate may be filtered, dried, and ground.
(Specification, page 5, lines 4-14)

The Examiner states that:

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> The material of Bauer et al. is made in a manner that is identical to the presently claimed method. In particular, a magnesium compound is mixed with a carbonate compound that is in a colution with a silicon cource and a monovalent cation source.
> (Office Action, page 3)

More specifically, the Examiner contends that the methods disclosed in Examples 1, 3 and 5 of Bauer are identical to the method used in the production of the synthetic layered silicates instantly claimed. Applicant respectfully traverses.

The section of Bauer cited against the present invention discloses a method in which three distinct solutions (Solution 1, Solution 2 and Solution 3) are combined to produce Synthetic Magnesium Silicates. The procedures used in Examples 1,3 and 5 of Bauer are identical and differ only in the ionic compositions of Solutions 1, 2 and 3. Although the argument presented here will focus on the methodological differences between Applicant's claimed invention and Bauer's Example 1, it is understood to be equally applicable to Bauer's Examples 3 and 5.

Bauer's Example 1 teaches that Solution 1 is composed of aqueous $MgSO_4$, Solution 2 is a mixture of NaOH, Li_2CO_3 and HF, and Solution 3 is a mixture of NaOH, Na_2CO_3 and "water glass", which is composed of Na_2O and SiO_2. Bauer then teaches that "Solution 2 is added to solution 1 at room temperature with vigorous stirring using a paddle stirrer, and then solution 3 is slowly added with further vigorous stirring. The mixture is then stirred for a further 5 hours at 200 °C. (Bauer, col. 8, lines 23-26)

The method described in Applicant's claim 2 differs substantially from that taught by Bauer. Applicant's claim 2 is directed to a three-step procedure. Applicant's claimed procedure is further described in Applicant's specification, which states, in part:

> Example 2 was prepared using the following procedure and the quantities of reactants listed in Table 1. The Li_2CO_3, 5.6 g, was dispersed in 168 g

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of water with agitation for 1 hour at ambient temperature. Water (269 g) was added to the lithium carbonate solution, followed by addition of 187 g of $MgSO_4 \cdot 7H_2O$. The magnesium sulfate was allowed to dissolve for a few minutes and then the solution was heated to 60°C. In a separate container, 75 g of Na_2CO_3 was dissolved in 300 g of water. The sodium carbonate solution was then added to the solution mixture of the lithium carbonate and magnesium sulfate over a period of 30 minutes, maintaining a temperature of 60°C. The sodium silicate solution (525 g) was added to the mixture of the magnesium sulfate, sodium carbonate and lithium carbonate over a period of 50 minutes, maintaining the temperature at 60°C. The resulting aqueous slurry was then heated to 98°C, and maintained at this temperature for 2 hours, condensing the vapor and returning the condensate to the aqueous slurry.
(Specification, page 21, lines 1-19)

Applicant contends that the method used to produce the inventive layered silicate differs substantially from, and is therefore not anticipated by, the method used in Bauer.

Applicant's amended claim 18, states:

18. A synthetic layered silicate prepared by the process comprising:

mixing a magnesium metal compound with a lithium compound solution, to form a magnesium/lithium mixture;

adding to the magnesium/lithium mixture a carbonate compound to form a magnesium/lithium/carbonate mixture; and

adding to the magnesium/lithium/carbonate mixture a silicate compound.

wherein the SiO_2/MgO is 2.20 to 2.40 and the lithium content is 0.40% to 0.80%.

Applicant submits that for at least the same reasons cited above, Applicant's claim 18 is patentable over Bauer.

The Examiner's contention that the rheological properties of the material produced by Bauer may be assumed to be inherently identical to those of the presently

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claimed invention are considered moot in light of the above. Since the presently claimed silicate material and its method of production are distinct from Bauer's, it is assumed that the rheological properties of Bauer's silicate product, when dispersed in an aqueous solution that contains 1 – 12 mEq electrolytes/g silicate, are likewise distinct.

In light of the above arguments, Applicant contends Bauer does not anticipate the amended claims pursuant to 35 U.S.C. § 102 (e) and respectfully requests that the Examiner withdraws his rejection on these grounds.

D.   Summary

In light of the above, Applicant believes the claims to be in condition for allowance. Applicant therefore respectfully requests the removal of all outstanding 35 U.S.C. § 112 and 35 U.S.C. § 102 rejections. Examiner's favorable reconsideration of the claims is therefore respectfully solicited.

A fee authorization form is enclosed for the excess claims fee. If any extension of time is required, Applicant hereby requests the appropriate extension of time. If any fees are inadvertently omitted or if any additional fees are required or have been overpaid, please appropriately charge or credit those fees to Meyertons, Hood, Kivlin, Kowert & Goetzel Deposit Account No. 50-1505/5628-06600/EBM.

Respectfully submitted,

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The Commissioner is also authorized to charge any extension fee or other fees which may be necessary to the same account number.

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